

WETLAND MITIGATION SITE MONITORING REPORT FAP 316 (IL 26), near Orangeville in Stephenson County, 2003

INTRODUCTION

This report details monitoring of the wetland mitigation site created to compensate for wetland loss and disturbance caused by the relocation of Illinois Route 26 near Orangeville in Stephenson County. The compensation site consists of approximately 3.4 ha (8.5 acres) of wetland creation (Site 1) and 3.3 ha (8.2 acres) of wetland enhancement (Site 2). The wetland creation is located north of the former West St. James Road, west of the Jane Addams bike trail (former railroad right-of-way), and east of the realigned Illinois Route 26 (legal location S/2, SW/4, Sect. 36, T 29 N, R 7 E). The wetland enhancement is located south of the former West St. James Road, along the east and west sides of Richland Creek, upstream and downstream from the bridge on relocated Illinois Route 26 (legal location E/2, NW/4, Sect. 1, T 28 N, R 7 E). Emergent wetland vegetation was planted at Site 1 on 28 July 2000. A seeding mixture was planted at Site 2, and around the perimeter of Site 1, in late August 2000. On-site monitoring was conducted on 26 September 2000 (Matthews et al. 2000), 22 and 23 August 2001 (Matthews et al. 2002a), 12 and 13 August 2002 (Matthews et al. 2002b), and 18 and 19 August 2003.

This report discusses the goals, objectives, and performance criteria for the mitigation project, the methods used for monitoring the site, the monitoring results from August 2003, and a discussion and recommendations based on those results. Methods and results are discussed by performance criteria for each goal.

Goals, Objectives, and Performance Standards

Goals, objectives, and performance standards follow those specified in the wetland compensation plan that the IDOT Wetlands Unit developed for this site. Each goal should be attained by the end of the 5-year monitoring period. Goals, objectives, and performance criteria are listed below.

Project goal 1: The created and enhanced wetland communities should be jurisdictional wetlands as defined by current federal standards.

Objective: The created wetland should compensate for the loss of 1.82 ha (4.5 acres) of emergent wetland and 0.08 ha (0.2 acres) of farmed wetland at a 1.8:1 ratio (8.5 acres of compensation). The enhanced wetland should compensate for an additional 1.32 ha (3.25 acres) at a 2.5:1 ratio (8.1 acres of compensation), which may be required by the recent Draft of Wetlands Administrative Rules (IDOT Wetlands Unit, Wetland Compensation Plan).

Performance criteria:

- a. Predominance of hydrophytic vegetation: More than 50% of the dominant plant species must be hydrophytic.
- b. Presence of wetland hydrology: The area must be either permanently or periodically inundated at average depths less than 2 m (6.6 ft) or have soils that are saturated to the surface for at least 12.5% of the growing season.
- c. Occurrence of hydric soils: Hydric soil characteristics should be present, or conditions favorable for hydric soil formation should persist at the site.

Project goal 2: The created wetland plant community should meet a standard for vegetation cover.

Objectives: An emergent marsh will be created, and a wet meadow will be enhanced, by planting native wetland vegetation.

Performance criterion: Planted vegetation should account for at least 50% of the ground cover at each of the sites.

METHODS

Project goal 1

a. Predominance of hydrophytic vegetation

The method for determining dominant vegetation at a wetland site is described in the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987) and further explained in the *Federal Manual for Identifying and Delineating Jurisdictional Wetlands* (Federal Interagency Committee for Wetland Delineation 1989). The relative Importance Value, a combination of relative coverage and relative frequency, of each species was determined by quantitatively sampling vegetation at each site (see project goal 2, below). Species were then arranged by Importance Value in decreasing order, and Importance Values were sequentially summed, starting with the most prevalent species, until the total reached 50. Those species included in the summation were considered dominant species. Each of the dominant plant species was then assigned its wetland indicator status rating (Reed 1988). Any plant rated facultative or wetter (*i.e.*, FAC, FAC+, FACW, or OBL) is considered a hydrophyte. A predominance of vegetation in the wetland plant community exists if more than 50% of the dominant species present are hydrophytic.

b. Presence of wetland hydrology

In April 2001, Illinois State Geological Survey (ISGS) personnel installed nine soil-zone monitoring wells, three stage gauges, a rain gauge, a sonic water-level data logger, and an RDS water-level data logger (Weaver and Carr 2001). In 2002, ISGS personnel installed additional monitoring wells, stage gauges, and water-level data loggers and produced topographic maps of the site. Locations for these instruments can be found in the ISGS report *Orangeville Wetland Compensation Site* (Weaver and Carr 2003). Methods are further described in the ISGS document *Annual report for active IDOT wetland compensation and hydrologic monitoring sites* (Fucciolo et al. 2003).

c. Occurrence of hydric soils

The soil was sampled in order to monitor hydric soil development. Soil profile morphology, including horizon color, texture, and structure, was described at various points throughout the site. Additionally, the presence, type, size, and abundance of redoximorphic features were noted.

Hydric soils typically develop slowly, and characteristics may not be apparent during the first several years after project construction. In the absence of hydric soil indicators at the end of the five-year monitoring period, hydrologic data could be used as corroborative evidence that conditions favorable for hydric soil formation persist at the site.

Project goal 2

Vegetation at the wetland enhancement and created wetland was quantitatively sampled using 0.5-m x 0.5-m (0.25 m²) quadrats placed every 30.5 m (100 ft) along transects. For the created marsh, the emergent zone was sampled separately from the higher elevation wet prairie border. Eight parallel transects placed every 30.5 m (100 ft) and running east to west were used to sample the emergent marsh zone, and a single transect running along the perimeter of the created wetland was used to sample the wet prairie border zone. Ten parallel transects placed every 30.5 m (100 ft) and running southeast to northwest were used to sample the wetland enhancement site. All plant species in each quadrat were recorded and each species was assigned a cover class (Table 1), an estimate of the amount of area within the sample quadrat that is covered by that species. Data from quadrats were used to calculate frequency (per cent of quadrats in which the species is present), relative frequency (frequency relative to other species), average cover per quadrat, relative cover, and Importance Value (average of relative frequency and relative cover) for each sampled species. Trees planted around the borders of both sites were censused to assess their survival.

Table 1: Cover classes used to estimate aerial cover by plant species in sample quadrats

Cover class	Range of aerial cover	Midpoint of range
r	<1%, solitary	0%
+	<1%, seldom	0%
1	1-5%	3%
2	5-25%	15%
3	25-50%	37.5%
4	50-75%	62.5%
5	75-95%	85%
6	95-100%	97.5%

Floristic quality assessment

The Floristic Quality Assessment (Taft et al. 1997) was applied to the plant community at each site to evaluate ecological integrity. The assessment methodology is used to identify natural areas and facilitate floristic comparisons among sites. This technique is part of the procedure for the long-term monitoring of natural areas and the monitoring of

restored or created wetlands (Swink and Wilhelm 1994). Plant species not native to Illinois are not included in the FQI. Each native plant species is assigned a coefficient of conservatism (C) ranging from 0 to 10. Lower numbers have been assigned to species that tend to be more tolerant of disturbance and higher numbers to species that are generally found in less disturbed natural areas. A mean coefficient value (mCv) is determined by summing the coefficients of conservatism (C) and dividing by the total number of native species (N). The Floristic Quality Index (FQI) is then determined by dividing the sum of the coefficients of conservatism by the square root of N. This calculation is done to incorporate numerical species diversity into the FQI value. Sites with FQI values less than 10 suggest that the area has been highly disturbed or is in an early successional stage. Sites with FQI values of 20 or more generally possess some evidence of natural character and may be considered environmental assets. Sites with values of 35 or more are considered to be of natural area quality.

RESULTS

Project goal 1

a. Predominance of hydrophytic vegetation

Dominant plant species for the created marsh (Site 1A), the wet prairie border (Site 1B) surrounding the marsh, and the wetland enhancement (Site 2) are shown in Tables 2, 3, and 4, respectively. At each of the three sites, greater than 50% of the dominant species are rated OBL, FACW or FAC, and therefore, the dominant vegetation is hydrophytic.

Table 2. Dominant plant species by stratum and wetland indicator status for the created wetland (Site 1A)

Dominant plant species	Stratum	Indicator status
1. <i>Alisma plantago-aquatica</i>	herb	OBL
2. <i>Bidens cernua</i>	herb	OBL
3. <i>Eleocharis acicularis</i>	herb	OBL
4. <i>Leersia oryzoides</i>	herb	OBL
5. <i>Polygonum hydropiper</i>	herb	OBL

Table 3. Dominant plant species by stratum and wetland indicator status for the wet prairie border of the created wetland (Site 1B)

Dominant plant species	Stratum	Indicator status
1. <i>Bidens frondosa</i>	herb	FACW
2. <i>Phalaris arundinacea</i>	herb	FACW+
3. <i>Rudbeckia hirta</i>	herb	FACU
4. <i>Salix exigua</i>	shrub	OBL
5. <i>Salix nigra</i>	shrub	OBL

Table 4. Dominant plant species by stratum and wetland indicator status for the wetland enhancement (Site 2)

Dominant plant species	Stratum	Indicator status
1. <i>Agrostis alba</i>	herb	FACW
2. <i>Bidens frondosa</i>	herb	FACW
3. <i>Cirsium vulgare</i>	herb	FACU-
4. <i>Leersia oryzoides</i>	herb	OBL
5. <i>Phalaris arundinacea</i>	herb	FACW+
6. <i>Scirpus atrovirens</i>	herb	OBL
7. <i>Solidago gigantea</i>	herb	FACW

b. Presence of wetland hydrology

Hydrologic data for the sites for September 2002 through August 2003 are presented in Appendix B (Weaver and Carr 2003). An estimated 3.20 of 3.40 ha (7.90 of 8.50 ac) at Site 1, and an estimated 1.90 of 3.32 ha (4.78 of 8.20 ac) at Site 2 conclusively satisfied the wetland hydrology criterion during the monitoring period (Figs. 1-2).

c. Occurrence of hydric soils

Soils on both the wetland enhancement and the wetland creation were originally found to be disturbed. At both sites, soils were intentionally removed exposing a lower substratum. Since site construction, new pedogenic processes have taken place and soils are developing accordingly. Hydric features are developing throughout both sites.

The soils at the created marsh are more disturbed than soils at the wetland enhancement. This area may have been excavated as much as 1.5 to 1.8 m (5 to 6 ft). Soils are much sandier towards the creek inlet. One of the near surface layers had an unusually bright matrix color. Although drier conditions occurred during the past year, this bright layer is probably a remnant layer that has maintained its pre-construction color, and is not a result of the drier conditions. Overall, the rest of the pedon described below, and others observed during the fieldwork, showed overwhelming evidence of hydric conditions. Concretions were found in many of the pedons throughout the site. The following is a description of a typical pedon within the created marsh.

Table 5. Description of the soils at the created marsh (Site 1A)

Depth (in)	Matrix Color	Concentrations	Depletions	Texture	Structure
0 – 3	10YR 2/2	10YR 4/6		Silt Loam	Granular
3 – 10	10YR 5/4	10YR 4/6	2.5Y 5/1	Silty Clay Loam	Sub-Blocky
10 – 17	10YR 5/2	10YR 4/6	10BG 5/	Silty Clay Loam	Sub-Blocky
17 – 20	10BG 4.5/	10YR 4/6	10GY 4/	Clay Loam	Massive
20 – 24	5BG 4/			Sandy Clay to Clay	Massive

The soils at the wet prairie border of the created wetland (Site 1B) are also disturbed. The soils here have not been excavated as deeply as the adjacent lower area. Although

this area is slightly higher, the soil does show prominent hydric features. Concretions were found in many of the pedons throughout the site. The following is a description of a typical pedon within the wet prairie border of the created marsh.

Table 6. Description of the soils at the border of the created marsh (Site 1B)

Depth (in)	Matrix Color	Concentrations	Depletions	Texture	Structure
0 – 2	10YR 2/1	5YR 3/4 & 7.5YR 3/4		Silt Loam	Granular
2 - 27	10YR 2/1	5YR 3/4		Silty Clay Loam	Sub-Blocky
27 – 34	10YR 5/2	7.5YR 5/8	5BG 5/	Clay to Sandy Clay	Massive

At the wetland enhancement (Site 2) the soils were excavated perhaps only 0.3 to 0.45 m (2 to 2.5 ft). No other type of anthropogenic disturbance is evident within the profile. A buried A horizon was found at 0.6 m (23 in). Even though the soil is disturbed, hydric soil indicators are distinctly present. A typical pedon is described below.

Table 7. Description of the soils at the enhanced wetland (Site 2)

Depth (in)	Matrix Color	Concentrations	Depletions	Texture	Structure
0 – 3	10YR 2/1			Silt Loam	Granular
3 – 16	10YR 2/1	10YR 3/4		Clay Loam	Sub-Blocky
16 – 23	10YR 3/1.5	10YR 3/4		Clay Loam	Massive
23 – 30	N 2.5/0			Silty Clay Loam	Granular

Project goal 2

The results of quantitative vegetation sampling for the emergent marsh zone of the created wetland, the wet prairie border of the created wetland, and the wetland enhancement are presented in Appendix C. In the emergent marsh zone of the created wetland nine planted wetland species were present in sampled quadrats. These species, combined, accounted for approximately 26.2% of the plant cover at the site. This is a small increase from 24.0% in 2002. *Alisma plantago-aquatica* accounted for 10.5% of the plant cover at the site, whereas the remaining eight planted species each accounted for less than 4% of the sampled plant cover for the entire site.

Nineteen planted species were present in quadrats in the wet prairie border of the created wetland. Together these nineteen species cover approximately 20.1% of the site. However, three of these species are not considered hydrophytic. In 2002, 49.9% of the plant cover at the site was made up by planted species.

Seven planted wetland species were present in quadrats in the wetland enhancement: *Juncus torreyi*, *Carex vulpinoidea*, *Carex stipata*, *Glyceria striata*, *Spartina pectinata*, *Scirpus atrovirens*, and *Leersia oryzoides*. Relative cover by planted wetland species increased from 10.3% in 2002 to 19.7% in 2003, mostly due to increased relative cover by *Leersia oryzoides*.

All planted saplings on the southeast border of the wetland enhancement site have survived through the third growing season, but some of the cottonwood trees have been damaged by beavers. Five saplings (4.8% of those planted at the site) along the border of the created wetland did not survive the first growing season, but no additional saplings have died during the second or third season. Surviving saplings are listed by species in Table 8.

Table 8: Surviving saplings at the wetland enhancement and created marsh

Common name	Botanical name	Number at enhancement	Number at created marsh
Birch	<i>Betula japonica</i>	0	2
River birch	<i>Betula nigra</i>	0	8
Green ash	<i>Fraxinus pennsylvanica</i>	4	0
Eastern cottonwood	<i>Populus deltoides</i>	10	20
Swamp white oak	<i>Quercus bicolor</i>	10	50
Bur oak	<i>Quercus macrocarpa</i>	0	20

Photographs illustrating vegetation at both sites are presented in Appendix D.

Floristic Quality Assessment

Mean coefficient of conservatism and FQI values were calculated for each site from the species lists included in Appendix A. For each site, mCv and FQI values were calculated using only species that became established on the site naturally (volunteer species), and then recalculated to include planted species (Table 9).

Table 9: Mean coefficient of conservatism (mCv) and Floristic Quality Index (FQI) values for wetland creation and enhancement sites

Site	Volunteer species only		Volunteer plus planted species	
	mCv	FQI	mCv	FQI
1A. Created marsh	2.5	18.0	2.8	23.2
1B. Wet prairie border	1.9	12.2	3.2	28.8
2. Wetland enhancement	2.1	17.6	2.3	20.9

DISCUSSION

After three years, these sites show good progress towards wetland establishment. There is a high probability that Site 1 will comply with project goals, objectives, and performance standards by the end of the monitoring period. In 2002, the wet prairie border of the created marsh (Site 1B) did not support dominant hydrophytic vegetation (Matthews et al. 2002b). This was due, in part, to the establishment of several non-hydrophytic species that were planted at the site or along Illinois Route 26. In 2001 and 2003, however, Site 1B did support dominant hydrophytic vegetation. Because Site 1B is a narrow band, vegetation was sampled with a single transect. In 2002, this transect may have been at a slightly higher elevation than in 2001 and 2003.

The 2002 and 2003 areal extent of wetland hydrology at Site 2 (Weaver and Carr 2002, 2003) decreased compared to the extent in 2001 (Figs. 1-2, Appendix B). An estimated 58.3% of the site satisfied the wetland hydrology criterion in 2003. Although Site 2 supports dominant hydrophytic vegetation, it is unlikely that the entire site will develop wetland hydrology by the end of the monitoring period.

Soils at both sites were seriously disturbed during the wetland creation process. Even so, soils at both the wetland enhancement and the created wetland have developed hydric soil indicators and meet the jurisdictional hydric soil criterion.

Planted wetland vegetation has established fairly well at Site 1A, the created marsh. Relative cover by planted species at Site 1A increased slightly in 2003 compared to the previous year (see Matthews et al. 2002b). Several of the species planted at the created marsh persist, and many are spreading from where they were originally planted. However, some of the deepwater emergent plants such as *Nuphar luteum*, *Nymphaea tuberosa*, and *Pontederia cordata* that were planted in 2000 were not observed at the site in 2001, 2002, or 2003. Coverage by planted species in the wet prairie border of the created marsh (Site 1B) decreased from almost 50% in 2002 to 20% in 2003. However, many of the planted species present in the wet prairie border in 2002 were not considered hydrophytic. The difference in percent cover by planted species was probably due to a small difference in transect location between 2002 and 2003. Planted vegetation at the wetland enhancement (Site 2) increased from 2002 to 2003, due largely to an increase in cover by a single species, *Leersia oryzoides*. Further monitoring is necessary to determine the success of planted wetland vegetation at both sites.

Floristic Quality Index values at the created marsh, the wet prairie border of the marsh, and the wetland enhancement sites, when planted species are included, approach or exceed those indicative of high natural quality. These values have increased each year since monitoring began (Matthews et al. 2000, 2002a, 2002b). If planted vegetation persists, and early successional species are replaced by more conservative species, the mCv and FQI values should continue to increase. *Phalaris arundinacea* (reed canary grass), an aggressive invasive grass, has become a dominant species at both sites and is abundant in much of the surrounding area. Relative cover and relative frequency of this species continue to increase at Site 2. Encroachment by *P. arundinacea* may lead to a decrease in species diversity and FQI, and should be considered a threat to the success of these wetlands. In addition, *Cirsium vulgare* has become a dominant species at Site 2, and is especially common in the drier portions of the site. Herbicide control of these species should be a management priority.

Literature Cited

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APPENDIX A: WETLAND DETERMINATION FORMS

ROUTINE ON-SITE WETLAND DETERMINATION

Site 1A (page 1 of 6)

Field Investigators: Matthews, Kurylo, Tessene, and Wilm

Date: 19 August 2003

Project Name: FAP 316

State: Illinois **County:** Stephenson **Applicant:** IDOT District 2

Site Name: Created marsh

Legal Description: S/2, SW/4, Sect. 36, T 29 N, R 7 E

Location: This created marsh is located north of the former West St. James Road, west of the Jane Addams bike trail (former Wisconsin and Calumet Railroad right-of-way), and east of the realigned Illinois Route 26.

Do normal environmental conditions exist at this site? Yes: ☒ No: ☐

Has the vegetation, soils, or hydrology been significantly disturbed? Yes: ☒ No: ☐

Comment: The site has been recently excavated, affecting soils and hydrology.

VEGETATION

Dominant Plant Species	Indicator Status	Stratum
1. <i>Alisma plantago-aquatica</i>	OBL	herb
2. <i>Bidens cernua</i>	OBL	herb
3. <i>Eleocharis acicularis</i>	OBL	herb
4. <i>Leersia oryzoides</i>	OBL	herb
5. <i>Polygonum hydropiper</i>	OBL	herb

Percentage of dominant species that are OBL, FACW, FAC+, or FAC: 100%

Hydrophytic vegetation: Yes: ☒ No: ☐

Rationale: More than 50% of the dominants are OBL, FACW, FAC+, or FAC.

SOILS

Series and phase: Mapped as Dorchester silt loam, revised to Typic Udorthent.

On county hydric soils list? Yes: ☐ No: ☒

Is the soil a histosol? Yes: ☐ No: ☒

Histic epipedon present? Yes: ☐ No: ☒

Redox Concentrations? Yes: ☒ No: ☐ Color: 5YR 4/6

Redox Depletions? Yes: ☒ No: ☐ Color: 2.5Y 5/1, 10BG 5/1, 10GY 4/

Matrix color: 10YR 2/2 over 10YR 5/4 over 10YR 5/2 atop 10BG 4.5/

Other indicators: Concretions

Hydric soils? Yes: ☒ No: ☐

Rationale: This is an excavated site where soils were stripped away exposing a lower substratum. While some of the colors may still be relict, there has been development of prominent hydric features. The bright 10YR 5/4 layer appearing this year in the soil profile may be a pre-construction relict. The F3 indicator from the NRCS is met by this soil.

ROUTINE ON-SITE WETLAND DETERMINATION

Site 1A (page 2 of 6)

Field Investigators: Matthews, Kurylo, Tessene, and Wilm

Date: 19 August 2003

Project Name: FAP 316

State: Illinois **County:** Stephenson **Applicant:** IDOT District 2

Site Name: Created marsh

Legal Description: S/2, SW/4, Sect. 36, T 29 N, R 7 E

Location: This created marsh is located north of the former West St. James Road, west of the Jane Addams bike trail (former Wisconsin and Calumet Railroad right-of-way), and east of the realigned Illinois Route 26.

HYDROLOGY

Inundated: Yes: No: X Depth of standing water: N/A

Depth to saturated soil: > 0.9 m (36 in)

Overview of hydrological flow through the system: This site receives water through precipitation and sheet flow from surrounding higher ground. Water leaves the site via evapotranspiration and stream flow via a culvert at the south end.

Size of Watershed: <100 km² (38.6 mi²)

Other field evidence observed: Barren, cracked soil in some areas

Wetland hydrology: Yes: X No:

Rationale: This site is located in an excavated depression and holds water for a very long time during the growing season. According to a report by ISGS personnel (Weaver and Carr 2003) an estimated 92.9% of the site was inundated or saturated for a sufficient duration to satisfy the wetland hydrology criterion during 2003.

DETERMINATION AND RATIONALE:

Is the site a wetland? Yes: X No:

Rationale: This site supports dominant hydrophytic vegetation, hydric soils, and wetland hydrology. We determined that this site is a wetland.

Determined by: Jeff Matthews, Paul Tessene, and Brian Wilm
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ROUTINE ON-SITE WETLAND DETERMINATION

Site 1A (page 3 of 6)

Field Investigators: Matthews, Kurylo, Tessene, and Wilm

Date: 19 August 2003

Project Name: FAP 316

State: Illinois **County:** Stephenson **Applicant:** IDOT District 2

Site Name: Created marsh

Legal Description: S/2, SW/4, Sect. 36, T 29 N, R 7 E

Location: This created marsh is located north of the former West St. James Road, west of the Jane Addams bike trail (former Wisconsin and Calumet Railroad right-of-way), and east of the realigned Illinois Route 26.

SPECIES LIST

Scientific Name	Common Name	Stratum	Wetland indicator status	Ct
<i>Acalypha rhomboidea</i>	three-seeded mercury	herb	FACU	0
<i>Amaranthus tuberculatus</i>	tall waterhemp	herb	OBL	1
<i>Ambrosia artemisiifolia</i>	common ragweed	herb	FACU	0
<i>Ammannia coccinea</i>	long-leaved ammannia	herb	OBL	5
<i>Aster pilosus</i>	hairy aster	herb	FACU+	0
<i>Aster puniceus firmus</i>	shining aster	herb	OBL	5
<i>Aster simplex</i>	panicled aster	herb	FACW	3
<i>Bidens cernua</i>	nodding beggar's ticks	herb	OBL	2
<i>Bidens frondosa</i>	common beggar's ticks	herb	FACW	1
<i>Bidens tripartita</i>	beggar's ticks	herb	OBL	2
<i>Bidens vulgata</i>	tall beggar's ticks	herb	FACW	0
<i>Carex stipata</i>	prickly sedge	herb	OBL	2
<i>Carex vulpinoidea</i>	fox sedge	herb	OBL	3
<i>Conyza canadensis</i>	horseweed	herb	FAC-	0
<i>Cyperus esculentus</i>	yellow nut-sedge	herb	FACW	0
<i>Cyperus strigosus</i>	straw-colored flatsedge	herb	FACW	0
<i>Echinochloa muricata</i>	barnyard grass	herb	OBL	0
<i>Eleocharis acicularis</i>	needle spike rush	herb	OBL	3
<i>Eleocharis erythropoda</i>	spike rush	herb	OBL	3
<i>Epilobium coloratum</i>	cinnamon willow herb	herb	OBL	3
<i>Erigeron annuus</i>	annual fleabane	herb	FAC-	1
<i>Erigeron philadelphicus</i>	marsh fleabane	herb	FACW	3
<i>Eupatorium maculatum</i>	spotted Joe Pye weed	herb	OBL	5
<i>Eupatorium perfoliatum</i>	common boneset	herb	FACW+	4
<i>Eupatorium serotinum</i>	late boneset	herb	FAC+	1
<i>Glyceria grandis</i>	American manna grass	herb	OBL	10
<i>Glyceria striata</i>	fowl manna grass	herb	OBL	4
<i>Gratiola neglecta</i>	clammy hedge hyssop	herb	OBL	5
<i>Helenium autumnale</i>	autumn sneezeweed	herb	FACW+	3
<i>Hordeum jubatum</i>	squirrel-tail	herb	FAC+	*

(continued on next page)

ROUTINE ON-SITE WETLAND DETERMINATION

Site 1A (page 4 of 6)

Field Investigators: Matthews, Kurylo, Tessene, and Wilm

Date: 19 August 2003

Project Name: FAP 316

State: Illinois **County:** Stephenson **Applicant:** IDOT District 2

Site Name: Created marsh

Legal Description: S/2, SW/4, Sect. 36, T 29 N, R 7 E

Location: This created marsh is located north of the former West St. James Road, west of the Jane Addams bike trail (former Wisconsin and Calumet Railroad right-of-way), and east of the realigned Illinois Route 26.

SPECIES LIST (continued)

Scientific Name	Common Name	Stratum	Wetland indicator status	C†
<i>Impatiens capensis</i>	jewelweed	herb	FACW	2
<i>Juncus dudleyi</i>	Dudley's rush	herb	FAC	4
<i>Juncus effusus solutus</i>	common rush	herb	OBL	4
<i>Juncus tenuis</i>	path rush	herb	FAC	0
<i>Juncus torreyi</i>	Torrey's rush	herb	FACW	3
<i>Lactuca serriola</i>	prickly lettuce	herb	FAC	*
<i>Leersia oryzoides</i>	rice cutgrass	herb	OBL	3
<i>Lemna minor</i>	common duckweed	herb	OBL	3
<i>Lycopus americanus</i>	common water horehound	herb	OBL	3
<i>Mimulus ringens</i>	monkey flower	herb	OBL	5
<i>Oenothera biennis</i>	evening primrose	herb	FACU	1
<i>Penthorum sedoides</i>	ditch stonecrop	herb	OBL	2
<i>Phalaris arundinacea</i>	reed canary grass	herb	FACW+	*
<i>Phleum pratense</i>	timothy	herb	FACU	*
<i>Plantago rugelii</i>	red-stalked plantain	herb	FAC	0
<i>Polygonum hydropiper</i>	common smartweed	herb	OBL	*
<i>Polygonum pensylvanicum</i>	giant smartweed	herb	FACW+	1
<i>Polygonum persicaria</i>	spotted lady's thumb	herb	FACW	*
<i>Populus deltoides</i>	eastern cottonwood	shrub	FAC+	2
<i>Rorippa islandica</i>	marsh yellow cress	herb	OBL	4
<i>Salix amygdaloides</i>	peach-leaved willow	shrub	FACW	4
<i>Salix exigua</i>	sandbar willow	shrub	OBL	1
<i>Salix nigra</i>	black willow	shrub	OBL	3
<i>Setaria glauca</i>	pigeon grass	herb	FAC	*
<i>Sium suave</i>	water parsnip	herb	OBL	5
<i>Solidago canadensis</i>	Canada goldenrod	herb	FACU	1
<i>Solidago gigantea</i>	late goldenrod	herb	FACW	3
<i>Taraxacum officinale</i>	common dandelion	herb	FACU	*
<i>Trifolium hybridum</i>	alsike clover	herb	FAC-	*
<i>Typha latifolia</i>	cattail	herb	OBL	1

(continued on next page)

ROUTINE ON-SITE WETLAND DETERMINATION

Site 1A (page 5 of 6)

Field Investigators: Matthews, Kurylo, Tessene, and Wilm

Date: 19 August 2003

Project Name: FAP 316

State: Illinois **County:** Stephenson **Applicant:** IDOT District 2

Site Name: Created marsh

Legal Description: S/2, SW/4, Sect. 36, T 29 N, R 7 E

Location: This created marsh is located north of the former West St. James Road, west of the Jane Addams bike trail (former Wisconsin and Calumet Railroad right-of-way), and east of the realigned Illinois Route 26.

SPECIES LIST (continued)

Scientific Name	Common Name	Stratum	Wetland indicator status	C†
<i>Verbena hastata</i>	blue vervain	herb	FACW+	3

† Coefficient of Conservatism (Taft et al. 1997)

* Non-native species

$$mCv = \sum C/N = 130/52 = 2.5$$

$$FQI = \sum C/N = 130/52 = 18.0$$

ROUTINE ON-SITE WETLAND DETERMINATION

Site 1A (page 6 of 6)

Field Investigators: Matthews, Kurylo, Tessene, and Wilm

Date: 19 August 2003

Project Name: FAP 316

State: Illinois **County:** Stephenson **Applicant:** IDOT District 2

Site Name: Created marsh

Legal Description: S/2, SW/4, Sect. 36, T 29 N, R 7 E

Location: This created marsh is located north of the former West St. James Road, west of the Jane Addams bike trail (former Wisconsin and Calumet Railroad right-of-way), and east of the realigned Illinois Route 26.

PLANTED SPECIES

Scientific Name	Common Name	Stratum	Wetland indicator status	C†
<i>Alisma plantago-aquatica</i>	broad-leaf water-plantain	herb	OBL	2
<i>Calamagrostis canadensis</i>	bluejoint grass	herb	OBL	3
<i>Caltha palustris</i>	cowslip	herb	OBL	7
<i>Carex lacustris</i>	river sedge	herb	OBL	6
<i>Eleocharis obtusa</i>	blunt spike rush	herb	OBL	2
<i>Iris shrevei</i>	southern blue flag	herb	OBL	5
<i>Polygonum amphibium</i>	water smartweed	herb	OBL	3
<i>Sagittaria latifolia</i>	arrowhead	herb	OBL	4
<i>Scirpus americanus</i>	chairmaker's rush	herb	OBL	3
<i>Scirpus atrovirens</i>	dark green bulrush	herb	OBL	4
<i>Scirpus cyperinus</i>	wool grass	herb	OBL	5
<i>Scirpus fluviatilis</i>	river bulrush	herb	OBL	3
<i>Scirpus tabernaemontanii</i>	great bulrush	herb	OBL	4
<i>Sparganium eurycarpum</i>	burreed	herb	OBL	5
<i>Spartina pectinata</i>	freshwater cord grass	herb	FACW+	4

† Coefficient of Conservatism (Taft et al. 1997)

* Non-native species

$$mCv = \sum C/N = 190/67 = 2.8^{**}$$

$$FQI = \sum C/N = 190/67 = 23.2^{**}$$

**These calculations include the complete species list above, as well as the planted species.

ROUTINE ON-SITE WETLAND DETERMINATION

Site 1B (page 1 of 6)

Field Investigators: Matthews, Kurylo, Tessene, and Wilm

Date: 19 August 2003

Project Name: FAP 316

State: Illinois **County:** Stephenson **Applicant:** IDOT District 2

Site Name: Wet prairie border of created marsh

Legal Description: S/2, SW/4, Sect. 36, T 29 N, R 7 E

Location: This created wetland is located north of the former West St. James Road, west of the Jane Addams bike trail (former Wisconsin and Calumet Railroad right-of-way), and east of the realigned Illinois Route 26. It borders site 1A, the created marsh.

Do normal environmental conditions exist at this site? Yes: ☒ No: ☐

Has the vegetation, soils, or hydrology been significantly disturbed? Yes: ☒ No: ☐

Comment: The site has been recently excavated, affecting soils and hydrology.

VEGETATION

Dominant Plant Species	Indicator Status	Stratum
1. <i>Bidens frondosa</i>	FACW	herb
2. <i>Phalaris arundinacea</i>	FACW+	herb
3. <i>Rudbeckia hirta</i>	FACU	herb
4. <i>Salix exigua</i>	OBL	shrub
5. <i>Salix nigra</i>	OBL	shrub

Percentage of dominant species that are OBL, FACW, FAC+, or FAC: 80%

Hydrophytic vegetation: Yes: ☒ No: ☐

Rationale: More than 50% of the dominants are OBL, FACW, FAC+, or FAC.

SOILS

Series and phase: Mapped as Dorchester silt loam, revised to Typic Udorthent

On county hydric soils list? Yes: ☐ No: ☒

Is the soil a histosol? Yes: ☐ No: ☒

Histic epipedon present? Yes: ☐ No: ☒

Redox Concentrations? Yes: ☒ No: ☐ Color: 7.5YR 3/4 and 5YR 3/4

Redox Depletions? Yes: ☐ No: ☒

Matrix color: 10YR 2/1 over 10YR 5/2

Other indicators: Concretions

Hydric soils? Yes: ☒ No: ☐

Rationale: This is an excavated site where soils were stripped away exposing a lower substratum. While the colors may be relict they are developing prominent hydric features. This soil has a low chroma matrix and iron masses. The NRCS hydric soil indicator of F3 is also met.

ROUTINE ON-SITE WETLAND DETERMINATION

Site 1B (page 2 of 6)

Field Investigators: Matthews, Kurylo, Tessene, and Wilm

Date: 19 August 2003

Project Name: FAP 316

State: Illinois **County:** Stephenson **Applicant:** IDOT District 2

Site Name: Wet prairie border of created marsh

Legal Description: S/2, SW/4, Sect. 36, T 29 N, R 7 E

Location: This created wetland is located north of the former West St. James Road, west of the Jane Addams bike trail (former Wisconsin and Calumet Railroad right-of-way), and east of the realigned Illinois Route 26. It borders site 1A, the created marsh.

HYDROLOGY

Inundated: Yes: No: X Depth of standing water: N/A

Depth to saturated soil: > 0.9 m (34 in)

Overview of hydrological flow through the system: This site receives water through precipitation and sheet flow from surrounding higher ground. Water leaves the site via evapotranspiration and sheet flow to Site 1A.

Size of Watershed: <100 km² (38.6 mi²)

Other field evidence observed: None

Wetland hydrology: Yes: X No:

Rationale: This site is in an excavated depression that remains inundated or saturated for a sufficient duration to satisfy the wetland hydrology criterion.

DETERMINATION AND RATIONALE:

Is the site a wetland? Yes: X No:

Rationale: This site supports dominant hydrophytic vegetation, hydric soils, and wetland hydrology. We determined that this site is a wetland.

Determined by: Jeff Matthews, Paul Tessene, and Brian Wilm
(vegetation and hydrology)
Jessica Kurylo
(soils and hydrology)
Illinois Natural History Survey
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Champaign, Illinois 61820
(217) 244-2168 (Matthews)

ROUTINE ON-SITE WETLAND DETERMINATION

Site 1B (page 3 of 6)

Field Investigators: Matthews, Kurylo, Tessene, and Wilm

Date: 19 August 2003

Project Name: FAP 316

State: Illinois **County:** Stephenson **Applicant:** IDOT District 2

Site Name: Wet prairie border of created marsh

Legal Description: S/2, SW/4, Sect. 36, T 29 N, R 7 E

Location: This created wetland is located north of the former West St. James Road, west of the Jane Addams bike trail (former Wisconsin and Calumet Railroad right-of-way), and east of the realigned Illinois Route 26. It borders site 1A, the created marsh.

SPECIES LIST

Scientific Name	Common Name	Stratum	Wetland indicator status	Ct
<i>Acalypha rhomboidea</i>	three-seeded mercury	herb	FACU	0
<i>Acer negundo</i>	box elder	shrub, herb	FACW-	1
<i>Agrostis alba</i>	red top	herb	FACW	0
<i>Ambrosia artemisiifolia</i>	common ragweed	herb	FACU	0
<i>Ambrosia trifida</i>	giant ragweed	herb	FAC+	0
<i>Apocynum cannabinum</i>	dogbane	herb	FAC	2
<i>Artemisia annua</i>	annual wormwood	herb	FACU	*
<i>Aster novae-angliae</i>	New England aster	herb	FACW	4
<i>Aster ontarionis</i>	Ontario aster	herb	FAC	4
<i>Aster pilosus</i>	hairy aster	herb	FACU+	0
<i>Aster simplex</i>	panicled aster	herb	FACW	3
<i>Bidens frondosa</i>	common beggar's ticks	herb	FACW	1
<i>Bidens tripartita</i>	beggar's ticks	herb	OBL	2
<i>Bidens vulgata</i>	tall beggar's ticks	herb	FACW	0
<i>Carduus acanthoides</i>	acanthus bristle thistle	herb	UPL	*
<i>Cirsium arvense</i>	Canada thistle	herb	FACU	*
<i>Cirsium vulgare</i>	bull thistle	herb	FACU-	*
<i>Conyza canadensis</i>	horseweed	herb	FAC-	0
<i>Cyperus esculentus</i>	yellow nut-sedge	herb	FACW	0
<i>Cyperus strigosus</i>	straw-colored flatsedge	herb	FACW	0
<i>Echinochloa muricata</i>	barnyard grass	herb	OBL	0
<i>Epilobium coloratum</i>	cinnamon willow herb	herb	OBL	3
<i>Erigeron annuus</i>	annual fleabane	herb	FAC-	1
<i>Eupatorium perfoliatum</i>	common boneset	herb	FACW+	4
<i>Fragaria virginiana</i>	wild strawberry	herb	FAC-	2
<i>Impatiens capensis</i>	jewelweed	herb	FACW	2
<i>Juncus dudleyi</i>	Dudley's rush	herb	FAC	4
<i>Lycopus americanus</i>	common water horehound	herb	OBL	3
<i>Lycopus virginicus</i>	bugle weed	herb	OBL	5

(continued on next page)

ROUTINE ON-SITE WETLAND DETERMINATION

Site 1B (page 4 of 6)

Field Investigators: Matthews, Kurylo, Tessene, and Wilm

Date: 19 August 2003

Project Name: FAP 316

State: Illinois **County:** Stephenson **Applicant:** IDOT District 2

Site Name: Wet prairie border of created marsh

Legal Description: S/2, SW/4, Sect. 36, T 29 N, R 7 E

Location: This created wetland is located north of the former West St. James Road, west of the Jane Addams bike trail (former Wisconsin and Calumet Railroad right-of-way), and east of the realigned Illinois Route 26. It borders site 1A, the created marsh.

SPECIES LIST (continued)

Scientific Name	Common Name	Stratum	Wetland indicator status	C†
<i>Melilotus alba</i>	white sweet clover	herb	FACU	*
<i>Morus alba</i>	white mulberry	herb	FAC	*
<i>Muhlenbergia frondosa</i>	common satin grass	herb	FACW	3
<i>Oenothera biennis</i>	evening primrose	herb	FACU	1
<i>Penthorum sedoides</i>	ditch stonecrop	herb	OBL	2
<i>Phalaris arundinacea</i>	reed canary grass	herb	FACW+	*
<i>Phleum pratense</i>	timothy	herb	FACU	*
<i>Poa pratensis</i>	Kentucky bluegrass	herb	FAC-	*
<i>Polygonum amphibium</i>	water smartweed	herb	OBL	3
<i>Polygonum hydropiper</i>	common smartweed	herb	OBL	*
<i>Polygonum persicaria</i>	spotted lady's thumb	herb	FACW	*
<i>Populus deltoides</i>	eastern cottonwood	shrub	FAC+	2
<i>Potentilla norvegica</i>	rough cinquefoil	herb	FAC	0
<i>Salix amygdaloides</i>	peach-leaved willow	shrub	FACW	4
<i>Salix exigua</i>	sandbar willow	shrub	OBL	1
<i>Salix nigra</i>	black willow	shrub	OBL	3
<i>Solidago canadensis</i>	Canada goldenrod	herb	FACU	1
<i>Solidago gigantea</i>	late goldenrod	herb	FACW	3
<i>Taraxacum officinale</i>	common dandelion	herb	FACU	*
<i>Trifolium hybridum</i>	alsike clover	herb	FAC-	*
<i>Trifolium pratense</i>	red clover	herb	FACU+	*
<i>Ulmus americana</i>	American elm	shrub	FACW-	5
<i>Verbena hastata</i>	blue vervain	herb	FACW+	3
<i>Vernonia fasciculata</i>	common ironweed	herb	FACW	5
<i>Veronica peregrina</i>	purslane speedwell	herb	FACW+	0

† Coefficient of Conservatism (Taft et al. 1997)

* Non-native species

$$mCv = \sum C/N = 77/40 = 1.9$$

$$FQI = \sum C/\sqrt{N} = 77/\sqrt{40} = 12.2$$

ROUTINE ON-SITE WETLAND DETERMINATION

Site 1B (page 5 of 6)

Field Investigators: Matthews, Kurylo, Tessene, and Wilm

Date: 19 August 2003

Project Name: FAP 316

State: Illinois **County:** Stephenson **Applicant:** IDOT District 2

Site Name: Wet prairie border of created marsh

Legal Description: S/2, SW/4, Sect. 36, T 29 N, R 7 E

Location: This created wetland is located north of the former West St. James Road, west of the Jane Addams bike trail (former Wisconsin and Calumet Railroad right-of-way), and east of the realigned Illinois Route 26. It borders site 1A, the created marsh.

PLANTED SPECIES

Scientific Name	Common Name	Stratum	Wetland indicator status	Ct
<i>Asclepias incarnata</i>	swamp milkweed	herb	OBL	4
<i>Aster puniceus firmus</i>	shining aster	herb	OBL	5
<i>Betula japonica</i>	birch	sapling	-----	*
<i>Betula nigra</i>	river birch	sapling	FACW	4
<i>Bidens cernua</i>	nodding beggar's ticks	herb	OBL	2
<i>Calamagrostis canadensis</i>	bluejoint grass	herb	OBL	3
<i>Carex lacustris</i>	river sedge	herb	OBL	6
<i>Carex vulpinoidea</i>	fox sedge	herb	OBL	3
<i>Echinacea purpurea</i>	purple coneflower	herb	UPL	6
<i>Eleocharis acicularis</i>	needle spike rush	herb	OBL	3
<i>Eleocharis obtusa</i>	blunt spike rush	herb	OBL	2
<i>Elymus canadensis</i>	Canada wild rye	herb	FAC-	4
<i>Eryngium yuccifolium</i>	rattlesnake master	herb	FAC+	7
<i>Eupatorium maculatum</i>	spotted Joe Pye weed	herb	OBL	5
<i>Glyceria striata</i>	fowl manna grass	herb	OBL	4
<i>Helenium autumnale</i>	autumn sneezeweed	herb	FACW+	3
<i>Helianthus mollis</i>	ashy sunflower	herb	UPL	7
<i>Iris shrevei</i>	southern blue flag	herb	OBL	5
<i>Juncus torreyi</i>	Torrey's rush	herb	FACW	3
<i>Leersia oryzoides</i>	rice cutgrass	herb	OBL	3
<i>Liatris aspera</i>	rough blazing star	herb	UPL	7
<i>Liatris pycnostachya</i>	button snakeroot	herb	FAC-	6
<i>Lobelia siphilitica</i>	blue cardinal-flower	herb	FACW+	4
<i>Panicum virgatum</i>	prairie switchgrass	herb	FAC+	4
<i>Physostegia virginiana</i>	false dragonhead	herb	FACW	6
<i>Populus deltoides</i>	eastern cottonwood	tree	FAC+	2
<i>Potentilla arguta</i>	prairie cinquefoil	herb	FACU-	10
<i>Quercus bicolor</i>	swamp white oak	tree	FACW+	7
<i>Quercus macrocarpa</i>	burr oak	tree	FAC-	5

(continued on next page)

ROUTINE ON-SITE WETLAND DETERMINATION

Site 1B (page 6 of 6)

Field Investigators: Matthews, Kurylo, Tessene, and Wilm

Date: 19 August 2003

Project Name: FAP 316

State: Illinois **County:** Stephenson **Applicant:** IDOT District 2

Site Name: Wet prairie border of created marsh

Legal Description: S/2, SW/4, Sect. 36, T 29 N, R 7 E

Location: This created wetland is located north of the former West St. James Road, west of the Jane Addams bike trail (former Wisconsin and Calumet Railroad right-of-way), and east of the realigned Illinois Route 26. It borders site 1A, the created marsh.

PLANTED SPECIES (continued)

Scientific Name	Common Name	Stratum	Wetland indicator status	C†
<i>Ratibida pinnata</i>	drooping coneflower	herb	UPL	4
<i>Rudbeckia hirta</i>	black-eyed susan	herb	FACU	2
<i>Rudbeckia subtomentosa</i>	fragrant coneflower	herb	FACW	5
<i>Scirpus atrovirens</i>	dark green bulrush	herb	OBL	4
<i>Scirpus fluviatilis</i>	river bulrush	herb	OBL	3
<i>Scirpus tabernaemontanii</i>	great bulrush	herb	OBL	4
<i>Silphium integrifolium</i>	wholeleaf rosinweed	herb	UPL	5
<i>Silphium laciniatum</i>	compass-plant	herb	FACU-	5
<i>Silphium perfoliatum</i>	cup plant	herb	FACW-	4
<i>Silphium terebinthinaceum</i>	dock rosin-weed	herb	FAC-	4
<i>Solidago rigida</i>	rigid goldenrod	herb	FACU-	4
<i>Sparganium eurycarpum</i>	burreed	herb	OBL	5
<i>Spartina pectinata</i>	freshwater cord grass	herb	FACW+	4

† Coefficient of Conservatism (Taft et al. 1997)

* Non-native species

$$mCv = \sum C/N = 258/80 = 3.2^{**}$$

$$FQI = \sum C/\sqrt{N} = 258/\sqrt{80} = 28.8^{**}$$

**These calculations include the complete species list above, as well as the planted species.

ROUTINE ON-SITE WETLAND DETERMINATION

Site 2 (page 1 of 7)

Field Investigators: Matthews, Kurylo, Tessene, and Wilm

Date: 18-19 August 2003

Project Name: FAP 316

State: Illinois **County:** Stephenson **Applicant:** IDOT District 2

Site Name: Wetland enhancement

Legal Description: E/2, NW/4, Sect. 1, T 28 N, R 7 E

Location: This wetland enhancement is located south of the former West St. James Road, along the east and west sides of Richland Creek, upstream and downstream from the bridge on relocated Illinois Route 26.

Do normal environmental conditions exist at this site? Yes: X No:

Has the vegetation, soils, or hydrology been significantly disturbed? Yes: X No:

Comment: The site has been excavated recently, affecting soils and hydrology.

VEGETATION

Dominant Plant Species	Indicator Status	Stratum
1. <i>Agrostis alba</i>	FACW	herb
2. <i>Bidens frondosa</i>	FACW	herb
3. <i>Cirsium vulgare</i>	FACU-	herb
4. <i>Leersia oryzoides</i>	OBL	herb
5. <i>Phalaris arundinacea</i>	FACW+	herb
6. <i>Scirpus atrovirens</i>	OBL	herb
7. <i>Solidago gigantea</i>	FACW	herb

Percentage of dominant species that are OBL, FACW, FAC+, or FAC: 86%

Hydrophytic vegetation: Yes: X No:

Rationale: More than 50% of the dominants are OBL, FACW, FAC+, or FAC.

SOILS

Series and phase: Mapped as Dorchester silt loam, revised to Typic Udorthent.

On county hydric soils list? Yes: No: X

Is the soil a histosol? Yes: No: X

Histic epipedon present? Yes: No: X

Redox Concentrations? Yes: X No: Color: 10YR 3/4

Redox Depletions? Yes: No: X

Matrix color: 10YR 2/1 over 10YR 3/1.5 over N 2.5/0

Other indicators: None

Hydric soils? Yes: X No:

Rationale: This is an excavated site where soils were stripped away exposing a lower substratum. Some of the observed colors are remnants of the old soil, however hydric indicators have developed since site construction. Therefore this is a hydric soil. This soil also meets the F3 hydric soil indicator from the NRCS.

ROUTINE ON-SITE WETLAND DETERMINATION

Site 2 (page 2 of 7)

Field Investigators: Matthews, Kurylo, Tessene, and Wilm

Date: 18-19 August 2003

Project Name: FAP 316

State: Illinois **County:** Stephenson **Applicant:** IDOT District 2

Site Name: Wetland enhancement

Legal Description: E/2, NW/4, Sect. 1, T 28 N, R 7 E

Location: This wetland enhancement is located south of the former West St. James Road, along the east and west sides of Richland Creek, upstream and downstream from the bridge on relocated Illinois Route 26.

HYDROLOGY

Inundated: Yes: X(parts) No: Depth of standing water: 0 to 0.1 m (0 to 4 in)

Depth to saturated soil: Varies from saturation at surface to 0.8 m (30 in)

Overview of hydrological flow through the system: This site receives water through precipitation, sheet flow from surrounding higher ground, and occasional overflow from Richland Creek and a tributary. Water leaves the site via evapotranspiration and sheet flow into Richland Creek and a tributary.

Size of Watershed: <100 km² (38.6 mi²)

Other field evidence observed: Water-borne sediment deposits on vegetation

Wetland hydrology: Yes: No: Undetermined: X

Rationale: This site occupies an excavated area along Richland Creek and is occasionally inundated. However, according to a report by ISGS personnel (Weaver and Carr 2003) only 1.90 ha (4.78 ac) of the site is inundated or saturated for a sufficient duration to satisfy the wetland hydrology criterion. In contrast, in 2001 3.28 ha (8.10 ac) satisfied the wetland hydrology criterion (Weaver and Carr 2001).

DETERMINATION AND RATIONALE:

Is the site a wetland? Yes: No: Undetermined: X

Rationale: Although this site supports hydrophytic vegetation and hydric soils, a large portion of it lacked wetland hydrology in 2002 and 2003. In 2001 a much larger portion of the site satisfied the wetland hydrology criterion. Further monitoring will be necessary to determine whether wetland hydrology has been established at this site.

Determined by: Jeff Matthews, Paul Tessene, and Brian Wilm
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ROUTINE ON-SITE WETLAND DETERMINATION

Site 2 (page 3 of 7)

Field Investigators: Matthews, Kurylo, Tessene, and Wilm

Date: 18-19 August 2003

Project Name: FAP 316

State: Illinois **County:** Stephenson **Applicant:** IDOT District 2

Site Name: Wetland enhancement

Legal Description: E/2, NW/4, Sect. 1, T 28 N, R 7 E

Location: This wetland enhancement is located south of the former West St. James Road, along the east and west sides of Richland Creek, upstream and downstream from the bridge on relocated Illinois Route 26.

SPECIES LIST

Scientific Name	Common Name	Stratum	Wetland indicator status	Ct
<i>Acalypha rhomboidea</i>	three-seeded mercury	herb	FACU	0
<i>Acer negundo</i>	box elder	shrub	FACW-	1
<i>Acer saccharinum</i>	silver maple	herb	FACW	1
<i>Agrostis alba</i>	red top	herb	FACW	0
<i>Alisma plantago-aquatica</i>	broad-leaf water-plantain	herb	OBL	2
<i>Amaranthus tuberculatus</i>	tall waterhemp	herb	OBL	1
<i>Ambrosia artemisiifolia</i>	common ragweed	herb	FACU	0
<i>Ambrosia trifida</i>	giant ragweed	herb	FAC+	0
<i>Angelica atropurpurea</i>	angelica	herb	OBL	6
<i>Apocynum cannabinum</i>	dogbane	herb	FAC	2
<i>Apocynum sibiricum</i>	Indian hemp	herb	FAC+	2
<i>Arctium minus</i>	common burdock	herb	UPL	*
<i>Artemisia annua</i>	annual wormwood	herb	FACU	*
<i>Asclepias syriaca</i>	common milkweed	herb	UPL	0
<i>Aster lateriflorus</i>	side-flowered aster	herb	FACW-	2
<i>Aster pilosus</i>	hairy aster	herb	FACU+	0
<i>Aster simplex</i>	panicled aster	herb	FACW	3
<i>Bidens cernua</i>	nodding beggar's ticks	herb	OBL	2
<i>Bidens frondosa</i>	common beggar's ticks	herb	FACW	1
<i>Bidens vulgata</i>	tall beggar's ticks	herb	FACW	0
<i>Bidens tripartita</i>	beggar's ticks	herb	OBL	2
<i>Brassica kaber</i>	charlock	herb	UPL	0
<i>Bromus inermis</i>	awnless brome grass	herb	UPL	*
<i>Bromus japonicus</i>	Japanese brome	herb	FACU	*
<i>Calystegia sepium</i>	American bindweed	herb	FAC	1
<i>Carex cristatella</i>	sedge	herb	FACW+	3
<i>Cichorium intybus</i>	chickory	herb	UPL	*
<i>Cirsium arvense</i>	Canada thistle	herb	FACU	*
<i>Cirsium vulgare</i>	bull thistle	herb	FACU-	*

(continued on next page)

ROUTINE ON-SITE WETLAND DETERMINATION

Site 2 (page 4 of 7)

Field Investigators: Matthews, Kurylo, Tessene, and Wilm

Date: 18-19 August 2003

Project Name: FAP 316

State: Illinois **County:** Stephenson **Applicant:** IDOT District 2

Site Name: Wetland enhancement

Legal Description: E/2, NW/4, Sect. 1, T 28 N, R 7 E

Location: This wetland enhancement is located south of the former West St. James Road, along the east and west sides of Richland Creek, upstream and downstream from the bridge on relocated Illinois Route 26.

SPECIES LIST (continued)

Scientific Name	Common Name	Stratum	Wetland indicator status	Ct
<i>Conyza canadensis</i>	horseweed	herb	FAC-	0
<i>Daucus carota</i>	Queen Anne's lace	herb	UPL	*
<i>Dipsacus sylvestris</i>	common teasel	herb	UPL	*
<i>Echinochloa muricata</i>	barnyard grass	herb	OBL	0
<i>Echinocystis lobata</i>	wild balsam-apple	herb	FACW-	4
<i>Eleocharis erythropoda</i>	spike rush	herb	OBL	3
<i>Epilobium coloratum</i>	cinnamon willow herb	herb	OBL	3
<i>Erechtites hieracifolia</i>	fire weed	herb	FACU	2
<i>Erigeron annuus</i>	annual fleabane	herb	FAC-	1
<i>Eupatorium perfoliatum</i>	common boneset	herb	FACW+	4
<i>Festuca arundinacea</i>	tall fescue	herb	FACU+	*
<i>Glechoma hederacea</i>	ground ivy	herb	FACU	*
<i>Helenium autumnale</i>	autumn sneezeweed	herb	FACW+	3
<i>Helianthus tuberosus</i>	Jerusalem artichoke	herb	FAC	3
<i>Hordeum jubatum</i>	squirrel-tail	herb	FAC+	*
<i>Impatiens capensis</i>	jewelweed	herb	FACW	2
<i>Juncus dudleyi</i>	Dudley's rush	herb	FAC	4
<i>Lactuca serriola</i>	prickly lettuce	herb	FAC	*
<i>Lemna minor</i>	common duckweed	herb	OBL	3
<i>Lobelia siphilitica</i>	blue cardinal-flower	herb	FACW+	4
<i>Lycopus americanus</i>	common water horehound	herb	OBL	3
<i>Melilotus alba</i>	white sweet clover	herb	FACU	*
<i>Mentha arvensis villosa</i>	field mint	herb	FACW	4
<i>Mentha x piperita</i>	peppermint	herb	OBL	*
<i>Mimulus ringens</i>	monkey flower	herb	OBL	5
<i>Muhlenbergia frondosa</i>	common satin grass	herb	FACW	3
<i>Myosoton aquaticum</i>	giant chickweed	herb	FAC+	*
<i>Oenothera biennis</i>	evening primrose	herb	FACU	1
<i>Oxalis stricta</i>	yellow wood sorrel	herb	FACU	0

(continued on next page)

ROUTINE ON-SITE WETLAND DETERMINATION

Site 2 (page 5 of 7)

Field Investigators: Matthews, Kurylo, Tessene, and Wilm

Date: 18-19 August 2003

Project Name: FAP 316

State: Illinois **County:** Stephenson **Applicant:** IDOT District 2

Site Name: Wetland enhancement

Legal Description: E/2, NW/4, Sect. 1, T 28 N, R 7 E

Location: This wetland enhancement is located south of the former West St. James Road, along the east and west sides of Richland Creek, upstream and downstream from the bridge on relocated Illinois Route 26.

SPECIES LIST (continued)

Scientific Name	Common Name	Stratum	Wetland indicator status	C†
<i>Pastinaca sativa</i>	parsnip	herb	UPL	*
<i>Penthorum sedoides</i>	ditch stonecrop	herb	OBL	2
<i>Phalaris arundinacea</i>	reed canary grass	herb	FACW+	*
<i>Phleum pratense</i>	timothy	herb	FACU	*
<i>Pilea pumila</i>	Canada clearweed	herb	FACW	3
<i>Plantago rugelii</i>	red-stalked plantain	herb	FAC	0
<i>Poa pratensis</i>	Kentucky bluegrass	herb	FAC-	*
<i>Polygonum hydropiper</i>	common smartweed	herb	OBL	*
<i>Polygonum lapathifolium</i>	curttop lady's thumb	herb	FACW+	0
<i>Polygonum pensylvanicum</i>	giant smartweed	herb	FACW+	1
<i>Polygonum punctatum</i>	dotted smartweed	herb	OBL	3
<i>Polygonum scandens</i>	climbing buckwheat	herb	FAC	2
<i>Populus deltoides</i>	eastern cottonwood	shrub, herb	FAC+	2
<i>Potentilla norvegica</i>	rough cinquefoil	herb	FAC	0
<i>Ranunculus repens</i>	creeping buttercup	herb	FAC+	*
<i>Ranunculus sceleratus</i>	cursed crowfoot	herb	OBL	3
<i>Ratibida pinnata</i>	drooping coneflower	herb	UPL	4
<i>Rudbeckia hirta</i>	black-eyed Susan	herb	FACU	2
<i>Rumex altissimus</i>	pale dock	herb	FACW-	2
<i>Rumex crispus</i>	curly dock	herb	FAC+	*
<i>Salix amygdaloides</i>	peach-leaved willow	shrub	FACW	4
<i>Salix exigua</i>	sandbar willow	shrub	OBL	1
<i>Salix nigra</i>	black willow	shrub	OBL	3
<i>Sambucus canadensis</i>	common elder	shrub	FACW-	2
<i>Scirpus tabernaemontanii</i>	great bulrush	herb	OBL	4
<i>Scrophularia marilandica</i>	late figwort	herb	FACU-	4
<i>Scutellaria lateriflora</i>	mad-dog skullcap	herb	OBL	4
<i>Setaria faberi</i>	giant foxtail	herb	FACU+	*
<i>Setaria glauca</i>	pigeon grass	herb	FAC	*

(continued on next page)

ROUTINE ON-SITE WETLAND DETERMINATION

Site 2 (page 6 of 7)

Field Investigators: Matthews, Kurylo, Tessene, and Wilm

Date: 18-19 August 2003

Project Name: FAP 316

State: Illinois **County:** Stephenson **Applicant:** IDOT District 2

Site Name: Wetland enhancement

Legal Description: E/2, NW/4, Sect. 1, T 28 N, R 7 E

Location: This wetland enhancement is located south of the former West St. James Road, along the east and west sides of Richland Creek, upstream and downstream from the bridge on relocated Illinois Route 26.

SPECIES LIST (continued)

Scientific Name	Common Name	Stratum	Wetland indicator status	C†
<i>Silphium perfoliatum</i>	cup plant	herb	FACW-	4
<i>Solidago canadensis</i>	Canada goldenrod	herb	FACU	1
<i>Solidago gigantea</i>	late goldenrod	herb	FACW	3
<i>Stellaria media</i>	common chickweed	herb	FACU	*
<i>Taraxacum officinale</i>	common dandelion	herb	FACU	*
<i>Thlaspi arvense</i>	field penny cress	herb	UPL	*
<i>Trifolium pratense</i>	red clover	herb	FACU+	*
<i>Trifolium repens</i>	white clover	herb	FACU+	*
<i>Typha latifolia</i>	cattail	herb	OBL	1
<i>Ulmus americana</i>	American elm	herb	FACW-	5
<i>Urtica dioica</i>	stinging nettle	herb	FAC+	2
<i>Verbascum thapsus</i>	woolly mullein	herb	UPL	*
<i>Verbena hastata</i>	blue vervain	herb	FACW+	3
<i>Verbena urticifolia</i>	white vervain	herb	FAC+	3

† Coefficient of Conservatism (Taft et al. 1997)

* Non-native species

$$mCv = \sum C/N = 149/72 = 2.1$$

$$FQI = \sum C/\sqrt{N} = 149/\sqrt{72} = 17.6$$

ROUTINE ON-SITE WETLAND DETERMINATION

Site 2 (page 7 of 7)

Field Investigators: Matthews, Kurylo, Tessene, and Wilm

Date: 18-19 August 2003

Project Name: FAP 316

State: Illinois **County:** Stephenson **Applicant:** IDOT District 2

Site Name: Wetland enhancement

Legal Description: E/2, NW/4, Sect. 1, T 28 N, R 7 E

Location: This wetland enhancement is located south of the former West St. James Road, along the east and west sides of Richland Creek, upstream and downstream from the bridge on relocated Illinois Route 26.

PLANTED SPECIES

Scientific Name	Common Name	Stratum	Wetland indicator status	C†
<i>Calamagrostis canadensis</i>	bluejoint grass	herb	OBL	3
<i>Carex vulpinoidea</i>	fox sedge	herb	OBL	3
<i>Carex stipata</i>	prickly sedge	herb	OBL	2
<i>Elymus canadensis</i>	Canada wild rye	herb	FAC-	4
<i>Fraxinus pennsylvanica</i>	green ash	tree	FACW	2
<i>Glyceria striata</i>	fowl manna grass	herb	OBL	4
<i>Juncus torreyi</i>	Torrey's rush	herb	FACW	3
<i>Leersia oryzoides</i>	rice cutgrass	herb	OBL	3
<i>Lolium perenne</i>	crested rye grass	herb	FACU	*
<i>Populus deltoides</i>	eastern cottonwood	tree	FAC+	2
<i>Quercus bicolor</i>	swamp white oak	tree	FACW+	7
<i>Scirpus atrovirens</i>	dark green bulrush	herb	OBL	4
<i>Spartina pectinata</i>	freshwater cord grass	herb	FACW+	4

† Coefficient of Conservatism (Taft et al. 1997)

* Non-native species

$$mCv = \sum C/N = 190/83 = 2.3^{**}$$

$$FQI = \sum C/\sqrt{N} = 190/\sqrt{83} = 20.9^{**}$$

**These calculations include the complete species list above, as well as the planted species.

APPENDIX B: HYDROLOGIC INFORMATION

Figure 1: Estimated extent of 2003 wetland hydrology at Site 1 (figure prepared by ISGS, from Weaver and Carr 2003).

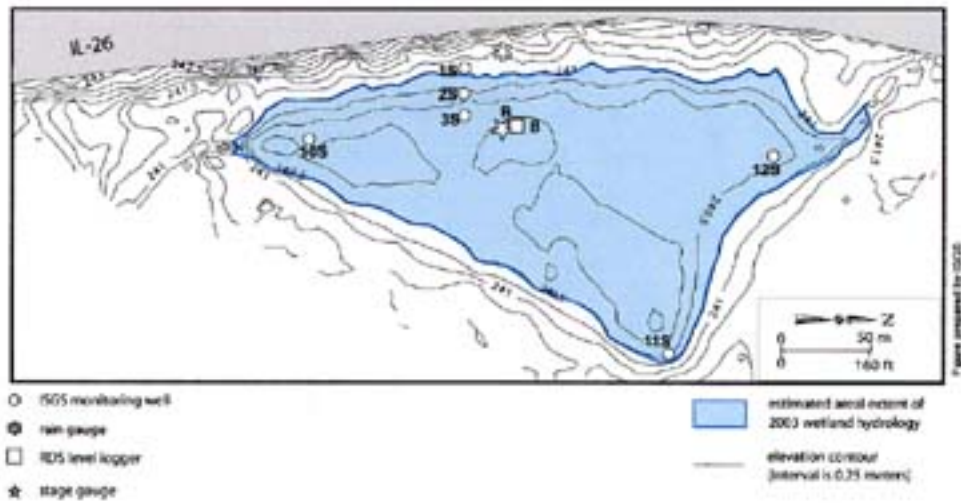
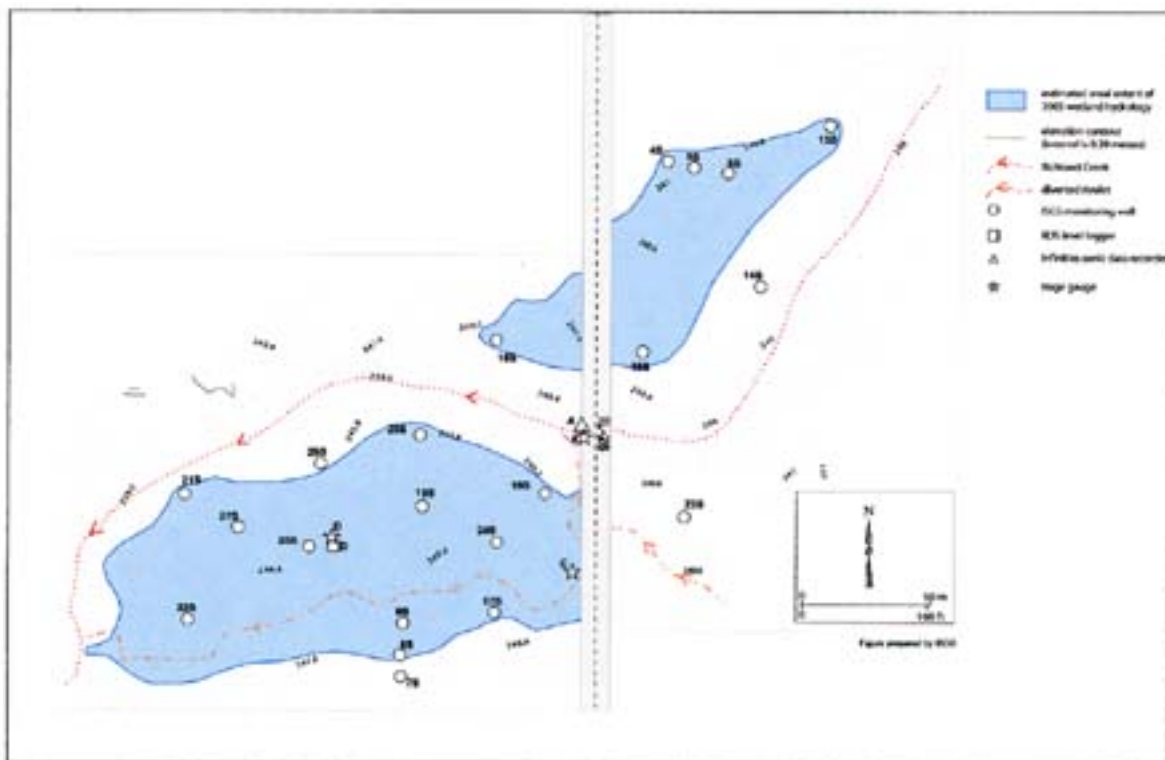


Figure 2: Estimated extent of 2003 wetland hydrology at Site 2 (figure prepared by ISGS, from Weaver and Carr 2003).



APPENDIX C: RESULTS OF QUANTITATIVE VEGETATION SAMPLING

Table 1: Results of 2003 quantitative vegetation sampling at Site 1A (created marsh)

Species	Frequency	Relative frequency	Average cover	Relative cover	IV
<i>Leersia oryzoides</i>	77.4	11.8	25.8	20.0	15.9
<i>Polygonum hydropiper</i>	71.0	10.8	19.1	14.8	12.8
<i>Eleocharis acicularis</i>	61.3	9.3	16.9	13.1	11.2
<i>Alisma plantago-aquatica</i>	32.3	4.9	13.5	10.5	7.7
<i>Bidens cernua</i>	61.3	9.3	5.7	4.4	6.9
<i>Phalaris arundinacea</i>	29.0	4.4	10.4	8.0	6.2
<i>Eleocharis obtusa</i>	38.7	5.9	1.9	1.5	3.7
<i>Carex lacustris</i>	19.4	2.9	4.4	3.4	3.2
<i>Scirpus fluviatilis</i>	16.1	2.5	4.3	3.3	2.9
<i>Lycopus americanus</i>	25.8	3.9	1.9	1.5	2.7
<i>Sagittaria latifolia</i>	25.8	3.9	1.5	1.2	2.6
<i>Scirpus tabernaemontanii</i>	12.9	2.0	3.8	3.0	2.5
<i>Lemna minor</i>	19.4	2.9	2.1	1.7	2.3
<i>Bidens tripartita</i>	22.6	3.4	1.1	0.8	2.1
<i>Bidens frondosa</i>	19.4	2.9	1.4	1.1	2.0
<i>Eupatorium perfoliatum</i>	9.7	1.5	1.8	1.4	1.4
<i>Scirpus americanus</i>	6.5	1.0	2.4	1.9	1.4
<i>Salix exigua</i>	9.7	1.5	1.5	1.1	1.3
<i>Penthorum sedoides</i>	12.9	2.0	0.4	0.3	1.1
<i>Erigeron philadelphicus</i>	3.2	0.5	2.0	1.6	1.0
<i>Echinochloa muricata</i>	9.7	1.5	0.7	0.5	1.0
<i>Cyperus strigosus</i>	6.5	1.0	1.0	0.8	0.9
<i>Typha latifolia</i>	6.5	1.0	1.0	0.8	0.9
<i>Epilobium coloratum</i>	6.5	1.0	0.6	0.5	0.7
<i>Sparganium eurycarpum</i>	6.5	1.0	0.6	0.5	0.7
<i>Scirpus atrovirens</i>	3.2	0.5	1.2	0.9	0.7
<i>Gratiola neglecta</i>	6.5	1.0	0.2	0.2	0.6
<i>Acalypha rhomboidea</i>	3.2	0.5	0.5	0.4	0.4
<i>Juncus effusus</i>	3.2	0.5	0.5	0.4	0.4
<i>Amaranthus tuberculatus</i>	3.2	0.5	0.1	0.1	0.3
<i>Eleocharis erythropoda</i>	3.2	0.5	0.1	0.1	0.3
<i>Erigeron annuus</i>	3.2	0.5	0.1	0.1	0.3
<i>Helenium autumnale</i>	3.2	0.5	0.1	0.1	0.3
<i>Juncus dudleyi</i>	3.2	0.5	0.1	0.1	0.3
<i>Juncus tenuis</i>	3.2	0.5	0.1	0.1	0.3
<i>Rorripa islandica</i>	3.2	0.5	0.1	0.1	0.3
<i>Setaria glauca</i>	3.2	0.5	0.1	0.1	0.3
<i>Trifolium repens</i>	3.2	0.5	0.1	0.1	0.3
<i>Taraxacum officinale</i>	3.2	0.5	0.0	0.0	0.2
<i>Scirpus cyperinus</i>	0.0	0.0	0.0	0.0	0.0
Sum	658	100	129	100	100

Table 2: Results of 2003 quantitative vegetation sampling at Site 1B (wet prairie border)

Species	Frequency	Relative frequency	Average cover	Relative cover	IV
<i>Phalaris arundinacea</i>	100.0	19.2	52.9	54.1	36.7
<i>Salix exigua</i>	13.8	2.6	6.0	6.2	4.4
<i>Rudbeckia hirta</i>	20.7	4.0	3.5	3.6	3.8
<i>Bidens frondosa</i>	24.1	4.6	2.0	2.0	3.3
<i>Salix nigra</i>	10.3	2.0	4.0	4.1	3.0
<i>Erigeron annuus</i>	24.1	4.6	1.1	1.2	2.9
<i>Lycopus americanus</i>	24.1	4.6	0.7	0.7	2.7
<i>Carex vulpinoidea</i>	17.2	3.3	1.3	1.4	2.3
<i>Trifolium hybridum</i>	17.2	3.3	1.3	1.4	2.3
<i>Solidago gigantea</i>	10.3	2.0	1.9	2.0	2.0
<i>Aster novae-angliae</i>	13.8	2.6	1.2	1.3	2.0
<i>Polygonum hydropiper</i>	13.8	2.6	0.8	0.8	1.7
<i>Bidens tripartita</i>	13.8	2.6	0.7	0.7	1.7
<i>Eupatorium perfoliatum</i>	6.9	1.3	1.8	1.9	1.6
<i>Silphium perfoliatum</i>	6.9	1.3	1.8	1.9	1.6
<i>Eleocharis obtusa</i>	10.3	2.0	1.1	1.2	1.6
<i>Ratibida pinnata</i>	10.3	2.0	1.1	1.2	1.6
<i>Echinochloa muricata</i>	13.8	2.6	0.4	0.4	1.5
<i>Aster puniceus firmus</i>	3.4	0.7	2.2	2.2	1.4
<i>Helenium autumnale</i>	3.4	0.7	2.2	2.2	1.4
<i>Acalypha rhomboidea</i>	13.8	2.6	0.2	0.2	1.4
<i>Carex sp.</i>	10.3	2.0	0.7	0.7	1.4
<i>Rudbeckia subtomentosa</i>	6.9	1.3	1.0	1.1	1.2
<i>Scirpus atrovirens</i>	6.9	1.3	1.0	1.1	1.2
<i>Agrostis alba</i>	10.3	2.0	0.3	0.3	1.2
<i>Bidens cernua</i>	10.3	2.0	0.3	0.3	1.2
<i>Eleocharis acicularis</i>	6.9	1.3	0.6	0.6	1.0
<i>Scirpus fluviatilis</i>	6.9	1.3	0.6	0.6	1.0
<i>Fragaria virginiana</i>	6.9	1.3	0.2	0.2	0.8
<i>Epilbium coloratum</i>	6.9	1.3	0.1	0.1	0.7
<i>Asclepias incarnata</i>	3.4	0.7	0.5	0.5	0.6
<i>Carex lacustris</i>	3.4	0.7	0.5	0.5	0.6
<i>Eupatorium maculatum</i>	3.4	0.7	0.5	0.5	0.6
<i>Lobelia siphilitica</i>	3.4	0.7	0.5	0.5	0.6
<i>Silphium integrifolium</i>	3.4	0.7	0.5	0.5	0.6
<i>Acer negundo</i>	3.4	0.7	0.1	0.1	0.4
<i>Apocynumcannabinum</i>	3.4	0.7	0.1	0.1	0.4
<i>Artemisia annua</i>	3.4	0.7	0.1	0.1	0.4
<i>Aster pilosus</i>	3.4	0.7	0.1	0.1	0.4
<i>Bidens vulgata</i>	3.4	0.7	0.1	0.1	0.4
<i>Cirsium arvense</i>	3.4	0.7	0.1	0.1	0.4
<i>Cyperus strigosus</i>	3.4	0.7	0.1	0.1	0.4
<i>Eryngium yuccifolium</i>	3.4	0.7	0.1	0.1	0.4
<i>Impatiens capensis</i>	3.4	0.7	0.1	0.1	0.4
<i>Juncus dudleyi</i>	3.4	0.7	0.1	0.1	0.4

Continued on next page

Table 2 (Continued)

Species	Frequency	Relative frequency	Average cover	Relative cover	IV
<i>Juncus torreyi</i>	3.4	0.7	0.1	0.1	0.4
<i>Lycopus virginiana</i>	3.4	0.7	0.1	0.1	0.4
<i>Morus alba</i>	3.4	0.7	0.1	0.1	0.4
<i>Muhlenbergia frondosa</i>	3.4	0.7	0.1	0.1	0.4
<i>Penthorum sedoides</i>	3.4	0.7	0.1	0.1	0.4
<i>Solidago canadensis</i>	3.4	0.7	0.1	0.1	0.4
<i>Taraxacum officinale</i>	3.4	0.7	0.1	0.1	0.4
Sum	521	100	98	100	100

Table 3: Results of 2003 quantitative vegetation sampling at Site 2 (wetland enhancement)

Species	Frequency	Relative frequency	Average cover	Relative cover	IV
<i>Phalaris arundinacea</i>	51.3	10.2	25.4	18.6	14.4
<i>Bidens frondosa</i>	41.0	8.1	18.7	13.7	10.9
<i>Leersia oryzoides</i>	38.5	7.6	17.4	12.8	10.2
<i>Agrostis alba</i>	23.1	4.6	7.3	5.3	4.9
<i>Cirsium vulgare</i>	23.1	4.6	4.6	3.4	4.0
<i>Solidago gigantea</i>	15.4	3.0	6.4	4.7	3.9
<i>Scirpus atrovirens</i>	17.9	3.6	5.4	3.9	3.8
<i>Salix nigra</i>	12.8	2.5	6.7	4.9	3.7
<i>Lactuca serriola</i>	23.1	4.6	2.2	1.6	3.1
<i>Impatiens capensis</i>	12.8	2.5	3.1	2.3	2.4
<i>Juncus dudleyi</i>	12.8	2.5	3.1	2.3	2.4
<i>Erigeron annuus</i>	10.3	2.0	2.4	1.7	1.9
<i>Acer negundo</i>	12.8	2.5	1.6	1.2	1.8
<i>Polygonum hydropiper</i>	12.8	2.5	1.6	1.2	1.8
<i>Polygonum punctatum</i>	10.3	2.0	2.1	1.6	1.8
<i>Lycopus americanus</i>	10.3	2.0	1.5	1.1	1.6
<i>Lolium perenne</i>	5.1	1.0	2.9	2.1	1.6
<i>Oxalis stricta</i>	12.8	2.5	0.5	0.3	1.4
<i>Bidens vulgata</i>	7.7	1.5	1.7	1.3	1.4
<i>Carex vulpinoidea</i>	10.3	2.0	0.9	0.7	1.4
<i>Juncus torreyi</i>	7.7	1.5	1.4	1.0	1.3
<i>Myosoton aquaticum</i>	10.3	2.0	0.6	0.5	1.2
<i>Verbena hastata</i>	7.7	1.5	1.2	0.8	1.2
<i>Bromus inermis</i>	7.7	1.5	0.8	0.6	1.1
<i>Carex</i> sp.	7.7	1.5	0.8	0.6	1.1
<i>Lemna minor</i>	2.6	0.5	2.2	1.6	1.1
<i>Polygonum pensylvanicum</i>	5.1	1.0	1.3	1.0	1.0
<i>Urtica dioica</i>	7.7	1.5	0.5	0.4	1.0
<i>Populus deltoides</i>	2.6	0.5	1.6	1.2	0.8
<i>Rudbeckia hirta</i>	2.6	0.5	1.6	1.2	0.8
<i>Aster pilosus</i>	5.1	1.0	0.8	0.6	0.8
<i>Bidens cernua</i>	5.1	1.0	0.8	0.6	0.8
<i>Bidens tripartita</i>	5.1	1.0	0.8	0.6	0.8
<i>Muhlenbergia frondosa</i>	5.1	1.0	0.8	0.6	0.8
<i>Poa pratensis</i>	5.1	1.0	0.8	0.6	0.8
<i>Asclepias syriaca</i>	5.1	1.0	0.5	0.3	0.7
<i>Setaria glauca</i>	5.1	1.0	0.5	0.3	0.7
<i>Carex stipata</i>	2.6	0.5	1.0	0.7	0.6
<i>Salix exigua</i>	2.6	0.5	1.0	0.7	0.6
<i>Trifolium repens</i>	5.1	1.0	0.2	0.1	0.6
<i>Apocynum cannabinum</i>	2.6	0.5	0.4	0.3	0.4
<i>Glyceria striata</i>	2.6	0.5	0.4	0.3	0.4
<i>Hordeum jubatum</i>	2.6	0.5	0.4	0.3	0.4
<i>Spartina pectinata</i>	2.6	0.5	0.4	0.3	0.4
<i>Acalypha rhomboidea</i>	2.6	0.5	0.1	0.1	0.3

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Table 3 (Continued)

Species	Frequency (%)	Relative frequency (%)	Average cover (%)	Relative cover (%)	Importance value
<i>Conyza canadensis</i>	2.6	0.5	0.1	0.1	0.3
<i>Glechoma hederacea</i>	2.6	0.5	0.1	0.1	0.3
<i>Oenothera biennis</i>	2.6	0.5	0.1	0.1	0.3
<i>Penthorum sedoides</i>	2.6	0.5	0.1	0.1	0.3
<i>Phleum pratense</i>	2.6	0.5	0.1	0.1	0.3
<i>Polygonum scandens</i>	2.6	0.5	0.1	0.1	0.3
<i>Setaria faberi</i>	2.6	0.5	0.1	0.1	0.3
<i>Solidago canadensis</i>	2.6	0.5	0.1	0.1	0.3
Sum	505	98	137	100	100

APPENDIX D: PHOTOGRAPHS OF WETLAND MITIGATION SITES

PHOTOGRAPH LEGENDS

Figure 1: View of Site 1 to the north.

Figure 2: View of Site 1 to the south.

Figure 3: View of Site 1 to the west.

Figure 4: View of Site 1 to the east.

Figure 5: View of Site 2 to the northeast from the south end of the bridge over Richland Creek.

Figure 6: View of Site 2 to the southeast from the north end of the bridge over Richland Creek.

Figure 7: View of Site 2 to the northwest from the south end of the bridge over Richland Creek.

Figure 8: View of Site 2 to the southwest from the north end of the bridge over Richland Creek.



Figure 1





Figure 3



Figure 4



Figure 5



Figure 6



Figure 7



Figure 8